
Juniper Wants to Build Self-Driving Networks

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Recently, I attended Juniper's analyst conference and had a chance to meet with executives including Rami Rahim, CEO; Pradeep Sindhu, Founder, Vice Chairman, and CTO; Jonathan Davidson, Executive VP and GM Juniper Development and Innovation; Mike Marcellin, SVP and CMO; Kireeti Kompella, SVP and CTO; Kannan Kothandaraman, VP Routing Product line; and Ankur Singla, VP SDN and Orchestration Systems. This is Juniper's 2nd analyst conference with Rami Rahim at the helm, and under Rahim's stewardship Juniper's vision and strategy has become increasingly differentiated and focused.

Juniper's executive team believes that for networking to advance, 4 important problems must be solved: increasing performance while Moore's Law is slowing, too much manual effort invested in maintaining existing networks, complex networks with too many layers, and establishing trust rather than relying on perimeter security. Juniper's executives believe that solving these problems will drive a state of digital cohesion, providing an improved user experience as the world goes digital and putting existing economies under pressure to transform. Juniper's thesis is that solving these problems will require making trade-offs between agility and performance, and it can leverage automation achieved through the use of artificial intelligence (AI) techniques and machine learning (ML) technology to change the agility-to-performance curve and continue to deliver market-leading networks it calls self-driving networks.

CREATING DIGITAL COHESION

Juniper believes that continual advancement in the face of Moore's Law slowing will require compute to grow by scaling out (becoming massively parallel) rather than scaling up, creating interconnected data centers, each with many 1,000s of servers required to handle applications such as augmented virtual reality, machine learning, IoT, and autonomous vehicles.

This will drive the creation of networks with 1,000s of nodes, too complex to be operated and maintained by humans typing at the command line interface. Automation will be essential—even imperative, according to Juniper—to change the current network management paradigm from one requiring continued human intervention to one where network management systems operate autonomously.

To compound matters, today's networks are built in hierarchies that operate independently, creating significant inefficiencies. Juniper believes this multi-layer approach to management of IP and optical transport networks is not sustainable, and automated and coordinated management layers must be developed to reduce complexity, once again minimizing the need for human interaction.

And finally, cohesion in digital transformation cannot be achieved if security is bolted on rather than designed in from the start. Automation coupled with strong authentication and techniques for sharing security tokens establishing trusted machine-to-machine (user operated devices, IoT, IP applications, network nodes, etc.) communications will play an important role in building networks that are based on a strong trust model rather than relying upon perimeter security.



FROM MANUAL TO SELF-DRIVING NETWORKS

The key enabler for moving from manual to automated or self-driving networks, as Juniper likes to call them, is the application of AI techniques and ML to drive network automation. AI and ML have seen a resurgence in investment with renewed promise because of 2 changes in recent years: availability of many more data points and deployment of specialized silicon providing highly parallel computation, increasing processing capacity for data processing and making AI and ML technology more capable of handling situations outside of the scope of the training set.

The expectation is ML, likely leveraging neural network technology, can be utilized to train AI systems to recognize patterns in vast amounts of real-time network telemetry data, providing early recognition of developing network performance issues before they negatively impact human experience. Then, policy-driven AI systems can take automatic action to change the course of events, avoiding outages impacting user experience.

TRACTION FOR CONTRAIL

Since the launch of openContrail, Juniper has introduced 2 commercial packages: Contrail Networking, focused on network virtualization, and Contrail Cloud, providing a complete cloud OS including DC orchestration and server, storage, and network virtualization. The Contrail product team within Juniper has grown to well over 100 employees with a professional services team of near equal size focused on Contrail deployments. Contrail Cloud is getting traction with telcos deploying NFV and Contrail Networking with cloud service providers (CSPs) offering SaaS and enterprises deploying SDN in their DCs for agility. Currently, the vast majority of deployments are with telcos and CSPs.

The SDN market is ramping and has high growth. In IHS's H1 2016 *Data Center and Enterprise SDN Hardware and Software Market Tracker - Regional*, we forecast in-use SDN revenue to hit \$16B by 2020 with \$4.9B in SDN controller revenue. Juniper's 2015 SDN controller revenue was \$12M, holding the #3 slot after Cisco and VMware. If Juniper continues to leverage its thought leadership position and grows a large openContrail ecosystem, it will be a strong contender for SDN software in the data center.

BOTTOM LINE

Juniper has laid out a new vision—digital cohesion—for networking and security that positions it as a thought leader using artificial intelligence and machine learning to provide high performance and secure networks. It is still early days in delivering on this vision, and much development needs to be done on understanding the nuances of embedding AI and ML into networking. Juniper's Contrail will provide an excellent perch point to introduce AI and ML creating a self-driving network. The challenge for Juniper will be maintaining the sustained AI and ML investment required until we see results that can be monetized.

As always, I welcome your feedback.

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